

Warm Up

Find the mean and range of the following numbers...

3, 8, 2, 4, 5, 9 $\text{Range} = \text{highest} - \text{lowest}$
 $= 9 - 2 = 7$
 $\text{Mean} = \frac{3+8+2+4+5+9}{6} = \frac{31}{6} = 5.1$

What if I said I want you to find the average of the average?

Standard Deviation is a....

measure that is used to quantify the amount of variation or dispersion of a set of data values

$$\bar{X} = \text{Mean} \quad \bar{X} = 5.1$$

Let's calculate S.D.

X	$X - \bar{X}$	$(X - \bar{X})^2$
2	$2 - 5.1 = -3.1$	$(-3.1)^2 = 9.61$
3	$3 - 5.1 = -2.1$	$(-2.1)^2 = 4.41$
4	$4 - 5.1 = -1.1$	$(-1.1)^2 = 1.21$
5	$5 - 5.1 = -0.1$	$(-0.1)^2 = 0.01$
8	$8 - 5.1 = 2.9$	$2.9^2 = 8.41$
9	$9 - 5.1 = 3.9$	$3.9^2 = 15.21$

Total: $\underline{38.86}$

Divide by the number of numbers: $\frac{38.86}{6}$
 $= 6.47$

This is called the VARIANCE

Square root your answer: $\sqrt{6.47} = 2.5$

This is called the Standard Deviation

Try this again..... Find the standard deviation

3, 5, 6, 7, 8, 9, 10, 12, 13

$$\bar{X} = \frac{3+5+6+7+8+9+10+12+13}{9}$$

$$\bar{X} = 8.1$$

X	$X - \bar{X}$	$(X - \bar{X})^2$
3	$3 - 8.1 = -5.1$	26.01
5	$5 - 8.1 = -3.1$	9.61
6	$6 - 8.1 = -2.1$	4.41
7	$7 - 8.1 = -1.1$	1.21
8	$8 - 8.1 = -0.1$	0.01
9	$9 - 8.1 = 0.9$	0.81
10	$10 - 8.1 = 1.9$	3.61
12	$12 - 8.1 = 3.9$	15.21
13	$13 - 8.1 = 4.9$	24.01

total: 84.89
 Variance $\sigma^2 = \frac{84.89}{9}$

Your turn...

Standard dev $\sigma = \sqrt{9.4} = 3.1$

Find the range, variance and standard deviation of

- 1) 3, 4, 5, 6, 7, 8, 10, 11 $\rightarrow 8$ #'s
- 2) 1, 2, 3, 4, 5, 6, 7, 8 $\rightarrow 8$ #'s
- 3) 10, 11, 14, 17, 19 $\rightarrow 5$ #'s
- 4) -3, -5, 1, 5, 2, -8 $\rightarrow 6$ #'s